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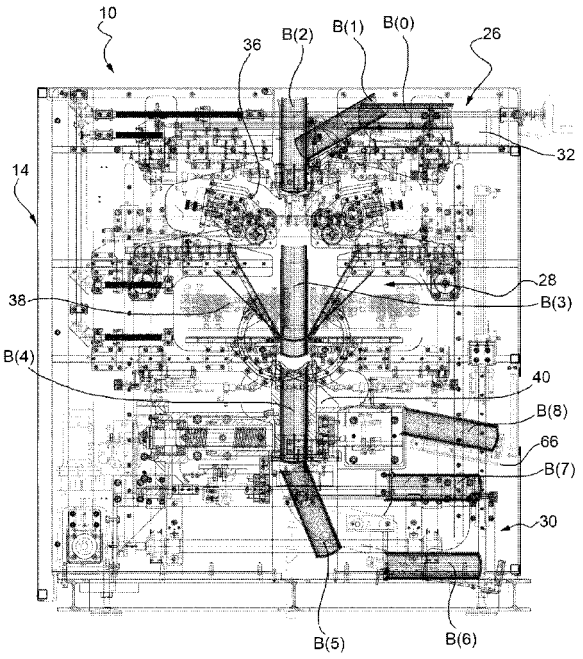
(54) Casing-in machine

(57) The machine (10) comprises a first machine part (12) arranged to prepare and supply the covers (C) and a second machine part (14) arranged to prepare the book blocks (B) and to apply the covers (C) supplied by the first machine part (14) onto the book blocks (B). The second machine part (14) has a book block loading area (26) for loading the book blocks (B), a working area (28) for applying the covers (C) onto the book blocks (B) and a book unloading area (30) for unloading the cased-in books. The working area (28) comprises a glue spreading station (36) arranged to spread the glue each time onto a book block (B), a cover applying station (38) arranged to insert each time a book block (B) into the respective cover (C), and a pressing station (40) arranged to press each time the assembly formed by a book block (B) and by the respective cover (C). The book block loading area (26), the glue spreading station (36), the cover applying station (38), the pressing station (40) and the book unloading area (30) arc arranged vertically in order from the top to the bottom. The machine further comprises a moving device (58) arranged to move each time a book block (B) from the exit of the book block loading area (26) to the entry of the book unloading area (30) through the working area (28) only by vertical translational movement from the top to the bottom with the book block (B) disposed so as to have its spine facing downwards and oriented horizontally.

FIG. 3



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Description

[0001] The present invention relates to a casing-in machine, that is to say, a machine arranged to apply a cover to a book block, and more particularly to a casing-in machine intended to produce books in which the cover, be it rigid, semi-rigid or soft, is glued to the book block by means of glue spread onto the opposite flat faces (the so-called flyleaves) of the book block.

[0002] A casing-in machine for applying a rigid cover onto a book block is known for instance from International Patent application W02007/128536 and basically comprises a loading area, where the book block to be cased-in is positioned, a working area, where the rigid cover is applied onto the book block, and an unloading area from the finished book is picked up. The working area comprises a glue spreading device arranged to spread the glue onto the flyleaves and the spine of the book block, a feeding and folding device arranged to feed and fold the rigid cover and a pressing device arranged to press the assembly formed by the rigid cover and by the book block to promote the adhesion between these latter. In particular, as far as the loading area is concerned, it comprises a first device made as a horizontally movable saddle and a second device made as a horizontally movable blade. The first device consists of two metal sheets inclined so as to converge towards an upper vertex where a horizontal slit is provided. Firstly, the book block, open in half and with its spine oriented horizontally, is placed by the operator onto the first device and moved by it horizontally from the loading area to beneath the working area. The second device is then raised by means of a screw-type driving mechanism, passing between the two metal sheets of the first device, leaving this latter through the above-mentioned slit and carrying the book block with it. The book block, arranged astride the second device, passes then through the working area from the bottom to the top and undergoes in order the operations of glue spreading, insertion into the cover and pressing. At this time, the second device is rotated 90 degrees about a vertical rotation axis to bring the finished book outside the working area and then moved downwards by means of the screw-type driving mechanism until it unloads the book in a special basket and leaves therefore the book. Finally, the second device is moved horizontally to be brought again, along with the first device, into the loading area to load another book block.

[0003] The casing-in machine known from this prior art document has a number of drawbacks. First of all, the use of a saddle-like device and of a blade-like device to load and move the book block among the various areas of the machine requires the opening of the book block and therefore on the one hand it implies a certain skill level by the operator responsible for loading the book blocks and on the other hand it involves the risk of damages to the sheets of the book block which are directly in contact first with the two metal sheets of the saddle-like device and then with the two opposite faces of the blade-like device. Moreover, the arrangement of the various areas of the machine (loading area, working area and unloading area) is such that the book block is moved inside the machine along a rather long and complicated path, with a first stage in which it translates horizontally, with a second stage in which it translates vertically upwards, with a third stage in which it rotates about a vertical axis and with a fourth stage in which it translates vertically downwards. Such a path on the one hand requires a rather complicated, and hence correspondingly expensive, moving system and on the other hand significantly affects the overall duration of the work cycle of the machine. As far as this latter aspect is concerned, in fact, it is to be noted that, once the operation of pressing the assembly formed by the book block and the cover is concluded, the second device must first be caused to rotate 90 degrees and then be caused to translate downwards to get back to the initial position beneath the working area.

[0004] US2008/0056735 discloses a casing-in machine arranged to produce so-called paperback books, wherein the covers - which can only be flexible covers - are applied onto the book blocks by means of glue spread only onto the spines of the book blocks, instead of onto the flyleaves. Moreover, according to this known solution the movement of the book blocks among the various stations of the machine is driven first by a pair of plates which clamp each time a book block acting on the flyleaves thereof and which change the orientation of the book block from inclined (at a sheet piling station) to vertical (at a glue spreading station), and then by pairs of rollers with horizontal axes which rollers also act onto the flyleaves of the book block. The movement of the book blocks among the various stations of the casing-in machine known from this prior art document is not therefore driven by a single moving device, but by a plurality of moving devices, and hence each book block must be transferred each time from a moving device to the next one, which results in an increase in the cycle time.

[0005] It is the object of the present invention to provide a casing-in machine which is not affected by the drawbacks of the prior art discussed above, and in particular which has a reduced cycle time, produce a high-quality finished product and can be easily adapted to books of different formats and thicknesses.

[0006] This and other objects are fully achieved according to the invention by virtue of a casing-in machine having the features set forth in the enclosed independent claim 1.

[0007] Advantageous embodiments of the invention are specified in the dependent claims, the content of which is to be intended as integral and integrating part of the following description.

[0008] In short, the invention is based on the idea of providing a casing-in machine comprising a first machine part arranged to supply and prepare the covers - which may be equally well rigid, semi-rigid or flexible covers - to be applied onto the book blocks and a second machine part arranged to prepare the book blocks and to apply

onto the book blocks the covers coming from the first machine part, wherein the second machine part has a book block loading area for loading the book blocks, a working area for applying the covers onto the book blocks and a book unloading area for unloading the finished books, wherein the working area comprises a glue spreading station arranged to spread the glue onto the flyleaves of the book block, a cover applying station arranged to insert the book block into the cover and a pressing station arranged to press the assembly formed by the book block and by the cover, wherein the book block loading area, the glue spreading station, the cover applying station, the pressing station and the book unloading area are vertically arranged in order from the top to the bottom, and wherein the machine further comprises a single moving device arranged to move at each cycle a book block from the book block loading area to the book unloading area through the working area only by means of vertical translational movement.

[0009] According to an advantageous aspect of the present invention, the machine is configured in such a manner that the book block is moved through the working area with the spine facing downwards and oriented horizontally, and to this end the moving device is provided with a pair of clamping members arranged to clamp the book block on horizontally opposite sides acting on the two smaller faces of the book block (where the expression "smaller faces" refers to the two parallel and opposite faces of the book block arranged perpendicularly both to the spine and to the flyleaves of the book block), and more specifically on the lower zone of these faces, that is to say, near the spine of the book block.

[0010] According to a further advantageous aspect of the present invention, the moving device is made in such a manner that it allows to change the distance between the two clamping members depending on the height of the spine of the book block. Moreover, the clamping members are advantageously provided with replaceable pads, in such a manner that it is possible to use each time pads having a width adapted to the thickness of the book block to be clamped. The machine is thus easily adaptable to books having different formats and thicknesses.

[0011] Further features and advantages of the present invention will become clearer from the following detailed description, given purely by way of non-limiting example with reference to the appended drawings, in which:

- Figure 1 is a front elevation view (i.e. on the side where the book blocks are loaded and unloaded) of a casing-in machine according to a preferred embodiment of the present invention;
- Figure 2 is a plan view of the machine of Figure 1;
- Figure 3 is a side elevation view (i.e. on the side of the working area) of the machine of Figures 1 and 2, showing the position of the book block in the various phases of the work cycle from entering the loading area to getting out of the unloading area;
- Figure 4 is a perspective view of the machine of Figures 1 to 3, on the same side as the view of Figure 3;
- Figure 5 is a perspective view of the machine of Figures 1 to 4, on the same side as the view of Figure 1, where the loading area, the working area and the unloading area of the machine can be observed;
- Figure 6 is an elevation view corresponding to the view of Figure 3, which shows in detail the book block moving device of the casing-in machine according to the invention, the moving device being shown at the same time in a first position (upper position) in which the book block is located at the glue spreading station and in a second position (lower position) in which the book block is located at the pressing station;
- Figure 7 is a plan view from below showing in detail the moving device of Figure 6;
- Figures 8A and 8B are elevation views, on the same side as the view of Figure 3, showing in detail the gripping members of the moving device of Figures 6 and 7, in case of clamping of a book block of greater width and of a book block of smaller width, respectively;
- Figure 9 is a perspective view showing the upper area (book block loading area) of the machine of Figures 1 to 5;
- Figure 10 is a perspective view showing a portion of the working area of the machine of Figures 1 to 5, particularly the cover applying station and the pressing station;
- Figure 11 is an elevation view, on the same side as the view of Figure 3, showing in detail a portion of the cover applying station of the machine of Figures 1 to 5, the cover applying station being shown at the same time in a first position, in which the two swinging plates of the cover applying device are oriented horizontally and the cover is arranged with its two cover plates on the two swinging plates, and in a second position, in which the two swinging plates are inclined to form a V and the book block is inserted into the cover; and
- Figure 12 is an elevation view, on the same side as the view of Figure 3, showing in detail the pressing station, as well as a portion of the unloading area, of the machine of Figures 1 to 5.

[0012] With reference first to Figures 1 to 3, reference numeral 10 generally indicates a casing-in machine according to a preferred embodiment of the present invention, which is arranged to apply covers C - which may be equally well rigid, semi-rigid or flexible covers - onto book blocks B by means of glue spread onto the flyleaves of the book blocks. The casing-in machine 10 basically comprises a first machine part 12 (right-hand part, according to the point of view of the observer of Figures 1 and 2) arranged to prepare and supply the covers C and a second machine part 14 (left-hand part, according to the point of view of the observer of Figures 1 and 2) ar-

ranged to prepare the book blocks B and to apply the covers supplied by the first machine part 12 onto the book blocks.

[0013] More specifically, the first machine part 12 has, at its opposite end with respect to the second machine part 14, a cover loading area 16 in which the operator responsible for the operation of the machine, or, alternatively, a loading robot, loads the covers C (not shown in Figures 1 to 3) arranging them piled on one another. In this connection, as already stated above, the casing-in machine according to the invention is able to work equally well with rigid or semi-rigid paperboard covers, or also with flexible plastic-coated covers. The first machine part 12 further comprises, at its end facing towards the second machine part 14, a cover preparing station 18 (which can be partially seen in Figure 10 as well) arranged to prepare the covers C in view of their subsequent application onto the book blocks B, and in particular to form the spine and the channels. The devices of which the cover preparing station 18 consists are of substantially known type and therefore will not be described in detail herein. The first machine part 12 is also provided of a cover moving device 20 comprising gripping members 22, which are arranged to pick up each time by means of suction pads the first cover C of the pile of covers disposed in the cover loading area 16, and horizontal guides 24, which are arranged to guide the gripping members 22 in a longitudinal horizontal direction X between the cover loading area 16 and the cover preparing station 18. During each work cycle, therefore, the cover moving device 20 picks up a cover C from the cover loading area 16, places it in the cover preparing station 18 and moves back to the cover loading area 16 where it is ready to pick up a new cover, while the cover C just supplied to the cover preparing station 18 undergoes suitable forming operations to give the desired shape (squared or convex) to the spine and to produce, if necessary, the channels. The cover C so prepared is then supplied to the second machine part 14 to be applied to the respective book block B, as will be explained in detail further on.

[0014] The second machine part 14 has a book block loading area 26 for loading the book blocks B, a working area 28 for applying the covers C onto the book blocks B and a book unloading area 30 for unloading the finished books (cased-in books). The three above-mentioned areas of the second machine part 14 are located one over the other in order from the top to the bottom, in such a manner that the movement of the book blocks B inside the machine, at least as far as the working area 28 is concerned, takes place substantially vertically, as can be clearly noted from the side elevation view of Figure 3, where the positions taken from time to time by a book block in the various phases of the work cycle are indicated B(0), B(1), ..., B(the), ..., B(8).

[0015] The book block loading area 26 (which can be partially seen in Figure 9, as well as in Figure 3) has an opening 32 located at the upper end of the second machine part 14, through which the book blocks B are inserted by the operator (or alternatively by a loading robot) oriented horizontally with their spine facing towards the inside of the machine, as indicated at B(0) in Figure 3. The book block loading area 26 is provided with a chute 34 (Figure 9) by means of which the book blocks B inserted horizontally through the opening 32 are conveyed to the inlet of the working area 28 oriented vertically with their spine facing downwards, as indicated at B(2) in Figure 3.

[0016] The working area 28 comprises, in order from the top to the bottom, a glue spreading station 36 arranged to spread the glue only onto the flyleaves of the book block B, a cover applying station 38 arranged to insert the book block B into the cover C so as to cause the plates of the cover to adhere to the flyleaves of the book block, and a pressing station 40 arranged to press the assembly formed by the book block B and the cover C.

[0017] The glue spreading station 36, which can be partially seen in Figures 3, 4 and 5, is substantially of per-se-known type and therefore will not be described in detail herein.

[0018] With reference in particular to Figures 10 and 11, the cover applying station 38 comprises a pair of swinging plates 42 having respective inner longitudinal edges 44 which extend parallel to the longitudinal direction X and at a distance from one another so as to define a longitudinal opening 46 having such a width as to allow the book block B to pass therethrough (as can be clearly seen in Figure 11), as well as an actuating device, generally indicated 48, operatively associated to the two swinging plates 42 to cause them to rotate between a horizontal position (shown both in Figure 10 and in Figure 11), in which the two swinging plates 42 are placed in the same horizontal plane, and an inclined position (shown only in Figure 11), in which the two swinging plates 42 are inclined to each other to form a V. In the proposed embodiment, the actuating device 48 comprises, for each swinging plate 42, a lever 50 in the shape of an arc of circumference, which is fixed at the one end to the bottom face of the respective swinging plate 42, and is articulated at the other end to a rod 52 of a respective linear actuator 54, in such a manner that the retraction of the rod 52 brings about the rotation of the respective swinging plate 42 from the horizontal position to the inclined position, whereas the extension of the rod 52 brings about the rotation of the respective swinging plate 42 from the inclined position to the horizontal position. The swinging plates 42 and the associated actuating device 48 are configured in such a manner that the width of the opening 46 remains approximately constant during the rotation of the swinging plates between the horizontal position and the inclined position. It is however clear that the configuration of the actuating device might be different from the one proposed herein.

[0019] The cover applying station 38 further comprises a pair of pressing rollers 56 which are located beneath the swinging plates 42 and are rotatable about respective horizontal rotation axes parallel to the longitudinal direc-

tion X. The pressing rollers 56 are arranged to apply pressure onto the opposite faces of the cover plates of the assembly formed by the book block B and the cover C while this latter is caused to translate downwards passing through the opening 46.

[0020] In use, the swinging plates 42 of the cover applying station 38 are first in the horizontal position and a cover C is placed on them, which cover comes from the first machine part 12, namely from the cover preparing station 18 described above, the cover plates resting with their outer faces on the top faces of the swinging plates 42. When the book block B coming from the above-placed glue spreading station 36 with its own spine in contact with (or close to) the cover C laying on the swinging plates 42, the swinging plates 42 are caused to rotate from the horizontal position to the inclined position while the book block B is moved downwards up to the condition, indicated B(3), in which the cover plates of the cover C are in contact with the respective flyleaves of the book block B. To this end, a control unit which governs the operation of the machine is programmed to suitably control the actuating device 48 associated to the swinging plates 42 and a book block moving device, which is generally indicated 58 in Figure 6 and will be described in detail further on with reference to that Figure (as well as to Figures 7, 8A and 8B), so as to coordinate the movements of downward translation of the book block B and of rotation of the swinging plates 42 from the horizontal position to the inclined position during the phase of application of the cover onto the book block.

[0021] With reference in particular to Figure 12, the pressing station 40 comprises a pair of pressing plates 60 oriented vertically and arranged to clamp, for a given time and with a given pressing force, between its own inner vertical faces, the assembly formed by the book block B and the cover C coming from the above-placed applying station 38, so as to ensure perfect adhesion of the cover to the book block. In the proposed embodiment, one of the two pressing plates 60 (the right-hand one, according to the point of view of the observer of Figure 12) is stationary, whereas the other pressing plate 60 (the left-hand one, according to the point of view of the observer of Figure 12) is arranged to be caused to translate horizontally towards or away from the stationary pressing plate under control of an actuating device 62. The position of the book block in the pressing station 40 is indicated B(4) in Figure 3.

[0022] The book unloading area 30 (which can be seen in particular in Figures 5 and 12, as well as in Figure 3) comprises a chute 64 located beneath the pressing station 40 to receive and guide the cased-in books coming from that station. The chute 64 has an arched shape such that the books coming from the pressing station 40 with a vertical orientation are laid with a horizontal orientation or with an orientation slightly inclined to the horizontal, as indicated at B(6) in Figure 3, in a collecting basket 66 which is first placed beneath the exit of the chute 64 on the same side as the second machine part 14 where the opening 32 of the loading area 26 is provided. The book unloading area 30 further comprises an actuating device, not shown in detail in the drawings as it is of per-se-known type, arranged to vertically move the collecting basket 66 between a lowered collecting position beneath the exit of the chute 64, where it receives the book leaving the working area 28 through the chute 64, and a raised unloading position, indicated B(8) in Figure 3, placed at such a height as to allows the operator to easily take the book. As can be seen in Figure 3, according to the proposed embodiment the raised unloading position of the collecting basket 66 is at a height corresponding to that of the pressing station 40, but might equally well be at a dif ferent height.

[0023] As stated above, the casing-in machine 10 further comprises the book block moving device 58 having the function to move at each cycle a book block B from the book block loading area 26 to the book unloading area 30 through the working area 28 by means of vertical translational movement in the direction from the top to the bottom.

[0024] With reference first to Figures 8A and 8B, the book block moving device 58 comprises a pair of clamping members 68 arranged to clamp the book block B on horizontally opposite sides acting on the two minor faces of the book block, wherein the expression "minor faces" refers to the two parallel and opposite faces of the book block arranged perpendicularly both to the spine and to the flyleaves of the book block. According to the view of Figure 6, the two minor faces of the book block B correspond to the two faces parallel to the plane of the drawing. Each of the two clamping members 68 comprises a rod 70 extending parallel to the longitudinal horizontal direction X, i.e. parallel to the direction along which the spine of the book block extends, and a pad 72 releasably fixed to an end of the rod 70. Each pad 72 is advantageously provided with a coating 74 of soft material, for instance of rubber, on its vertical face intended to be pressed against a respective minor face of the book block B. The clamping members 68 are movable between an open position, in which they allow the insertion of a book block B between the pads 72, and a closed position (shown in Figures 8A and 8B), in which the book block B is clamped between the pads 72 with a given clamping force to be driven by the moving device 58 from the book block loading area 26 to the book unloading area 30 through the working area 28. To this end, the moving device 58 further comprises a linear actuator 76 operatively associated to the rod 70 of one of the two clamping members 68 to move the respective pad towards the pad of the other clamping member (closed position) or to move the respective pad away from the pad of the other clamping member (open position).

[0025] According to an advantageous aspect of the present invention, in order to allow to change the distance between the abutment surfaces of the pads 72 of the two clamping members 68 depending on the height of the spine of the book block B to be clamped, the machine is

provided with a kit of rods 70 of different lengths. One of the two rods 70 (the left-hand rod, in the view of Figures 8A and 8B) is fixed, whereas the other (the right-hand rod, in the view of Figures 8A and 8B) can be chosen from time to time depending on the height of the spine of the book block. In this connection, Figure 8A shows the use, as right-hand rod, of a rod of smaller length suitable for a book block B having a spine of greater height, whereas Figure 8B shows the use, as right-hand rod, of a rod of greater length suitable for a book block B having a spine of smaller height. In the illustrated embodiment, the linear actuator 76 is associated to the right-hand rod 70, i.e. to the replaceable rod. According to a further advantageous aspect of the present invention, the pads 72 can also be replaced to allow to use each time pads of sizes (in particular of width) adapted to the sizes (in particular to the thickness) of the book block B to be clamped. Therefore, the machine will be equipped also with a kit of pads 72 of different sizes. The machine is therefore easily adaptable even to book blocks having formats which differ significantly from each other, as it suffices to replace one of the two rods 70 and/or the two pads 72 depending on the format of the book block to be cased-in.

[0026] Each of the rods 70 of the two clamping members 68 is supported, at its end opposite to the one where the pad 72 is mounted, by a respective support structure 78 which in turn is mounted on a respective cross-member 80, of which only the one facing towards the outside of the machine can be seen in Figure 6. Each of the two cross-members 80 is slidably mounted along a pair of vertical linear guides 82 fixed to a respective vertical wall 84 of the second machine part 14 so as to translate vertically between an upper end-of-travel position and a lower end-of-travel position (both illustrated in Figure 6), in which the book block B clamped between the clamping members 68 supported by the cross-members 80 is in the position B(2) at the inlet of the working area 28 (glue spreading station 36) and in the position B(4) at the outlet of the working area 28 (pressing station 40), respectively. The vertical translational movement of each assembly formed by the clamping member 68, by the support structure 78 and by the cross-member 80 is driven by a respective belt actuating device comprising a pair of belts 86 (Figures 4 and 5) to which the respective cross-member 80 is fixed, each belt 86 being wound around a lower pulley 88 acting as driving pulley and around an upper pulley 90 acting as driven pulley. Each pair of driving pulleys 88 is mounted on a respective shaft 92 coupled to the output of a respective angle gear 94. The inputs of the two angle gears 94 are both coupled to a drive shaft 96 of an electric motor 98 (Figure 7), so as to ensure synchronized movement of the two cross-members 80 by the respective belt actuating devices.

[0027] As can be clearly noticed from the above description, in the casing-in machine according to the present invention, unlike for instance the casing-in machine known from document US2008/0056735 discussed in the introductory part of the description, the book block is moved through the working area by a single moving device and therefore does not need to be transferred from a device to another. Such a measure clearly allows to minimize the cycle time of the machine, beyond ensuring a high quality of the end product.

[0028] Naturally, the principle of the invention remaining unchanged, the embodiments and manufacturing details may be widely varied with respect to those described and illustrated purely by way of non-limiting example.

Claims

1. Casing-in machine (10) arranged to apply rigid, semi-rigid or flexible covers (C) onto book blocks (B), the machine comprising a first machine part (12) arranged to prepare and supply the covers (C) and a second machine part (14) arranged to prepare the book blocks (B) and to apply the covers (C) supplied by the first machine part (14) onto the book blocks (B),
   wherein the second machine part (14) has a book block loading area (26) for loading the book blocks (B), a working area (28) for applying the covers (C) onto the book blocks (B) and a book unloading area (30) for unloading the cased-in books,
   wherein the working area (28) comprises a glue spreading station (36) arranged to spread the glue each time onto the flyleaves of a book block (B), a cover applying station (38) arranged to insert each time a book block (B) into the respective cover (C) and a pressing station (40) arranged to press each time the assembly formed by a book block (B) and by the respective cover (C),
   wherein the book block loading area (26), the glue spreading station (36), the cover applying station (38), the pressing station (40) and the book unloading area (30) are arranged vertically in order from the top to the bottom,
   wherein the machine further comprises a single moving device (58) arranged to move each time a book block (B) from the exit of the book block loading area (26) to the entry of the book unloading area (30) through the working area (28) only by vertical translational movement from the top to the bottom with the book block (B) disposed so as to have its spine facing downwards and oriented horizontally.

2. Machine according to claim 1, wherein the moving device (58) comprises a pair of clamping members (68) arranged to clamp the book block (B) on horizontally opposite sides acting on the two smaller faces thereof, a first actuating mechanism (76) arranged to move the clamping members (68) relative to each other between an open position, in which the clamping members (68) allow a book block (B) to be inserted between them, and a closed position, in which the clamping members (68) clamp the book block

(B) inserted between them, and a second actuating mechanism (84, 88, 90, 92, 94, 96, 98) arranged to cause the two clamping members (68) to translate vertically in a synchronized manner.

3. Machine according to claim 2, wherein each clamping member (68) comprises a rod (70) and a pad (72) mounted at an end of the rod (70), and wherein the first actuating mechanism (76) comprises a linear actuator (76) operatively associated to the rod (70) of at least one of the two clamping members (68) to cause it to translate parallel to its own axis relative to the rod (70) of the other clamping member.

4. Machine according to claim 3, comprising a kit of rods (70) of different lengths to be used to replace at least one of the rods (70) of the two clamping members (68), so as to allow the distance between the pads (72) of the two clamping members (68) to be adjusted depending on the height of the spine of the book block (B) to be clamped.

5. Machine according to claim 3 or claim 4, comprising a kit of pads (72) of different sizes to be used to replace the pads (72) of the two clamping members (68), so as to allow to use each time pads (72) of suitable sizes for the book block (B) to be clamped.

6. Machine according to any of claims 2 to 5, wherein each clamping member (68) is mounted on a respective cross-member (80) and wherein the second actuating mechanism (84, 88, 90, 92, 94, 96, 98) comprises, for each clamping member (68), a pair of vertical linear guides (82) along which the cross-member (80) is slidably mounted, first and second belts (86) to which the cross-member (80) is attached, a first pair of lower (88) and upper (90) pulleys around which the first belt (86) is wound, a second pair of lower (88) and upper (90) pulleys around which the second belt (86) is wound, a shaft (92) to which the lower pulleys (88) or the upper pulleys (90) associated to the first and second belts (86) are fitted, and motor means (94, 96) arranged to drive the shaft (92) into rotation.

7. Machine according to claim 6, wherein said motor means (94, 96) comprise an electric motor (96) and a pair of angle gears (94), the inputs of the angle gears (94) being both coupled to a drive shaft (96) of the electric motor (98) and the outputs of the angle gears (94) being coupled each to the shaft (92) associated to either of the clamping members (68).

8. Machine according to any of the preceding claims, wherein the book block loading area (26) has an opening (32) located at the top end of the second machine part (14) for insertion of the book blocks (B) and a first chute (34) configured in such a manner that the book blocks (B) inserted horizontally through the opening (32) are conveyed to the entry of the working area (28) oriented vertically with their spines facing downwards.

9. Machine according to any of the preceding claims, wherein the cover applying station (38) comprises a pair of swinging plates (42) having respective longitudinal inner edges (44) which extend spaced from each other so as to define a longitudinal opening (46) having a width substantially equal to the thickness of a book block (B), the two swinging plates (42) being operable to rotate between a horizontal position, in which they are disposed in the same horizontal plane, and an inclined position, in which they are inclined to each other so as to form a V.

10. Machine according to claim 9, wherein the cover applying station (38) further comprises a pair of pressing rollers (56) located below the swinging plates (42) and arranged to apply a pressure onto the opposite faces of the cover plates of the assembly formed by the book block (B) and the cover (C) while this latter is caused to translate downwards passing through the longitudinal opening (46).

11. Machine according to any of the preceding claims, wherein the book unloading area (30) comprises a second chute (64) located beneath the pressing station (40) to receive and guide the cased-in books coming from that station, the chute (64) being configured in such a manner that it causes the cased-in books coming with a vertical orientation from the pressing station (40) to assume at its outlet a horizontal orientation.

12. Machine according to claim 11, wherein the book unloading area (30) further comprises a collecting basket (66) vertically movable between a lowered collecting position, placed beneath the outlet of the second chute (64), and a raised unloading position.

13. Machine according to any of the preceding claims, wherein the second machine part (14) is configured in such a manner that the book blocks (B) are inserted and the cased-in books are picked up on the same side of that machine part.

14. Machine according to any of the preceding claims, wherein the first machine part (12) comprises a cover loading area (16) located at the opposite end with respect to the second machine part (14) for loading the covers (C) piled on each other, a cover preparing station (18) located at the end facing towards the second machine part (14) for preparing the covers (C) in view of the following application onto a book block (B), and a cover moving device (20) comprising suction-pad gripping members (22) arranged to take

each time the first cover (C) out of the pile of covers in the cover loading area (16) and guide means (24) arranged to guide said gripping members in a longitudinal horizontal direction (X) between the cover loading area (16) and the cover preparing station (18).

FIG. 1

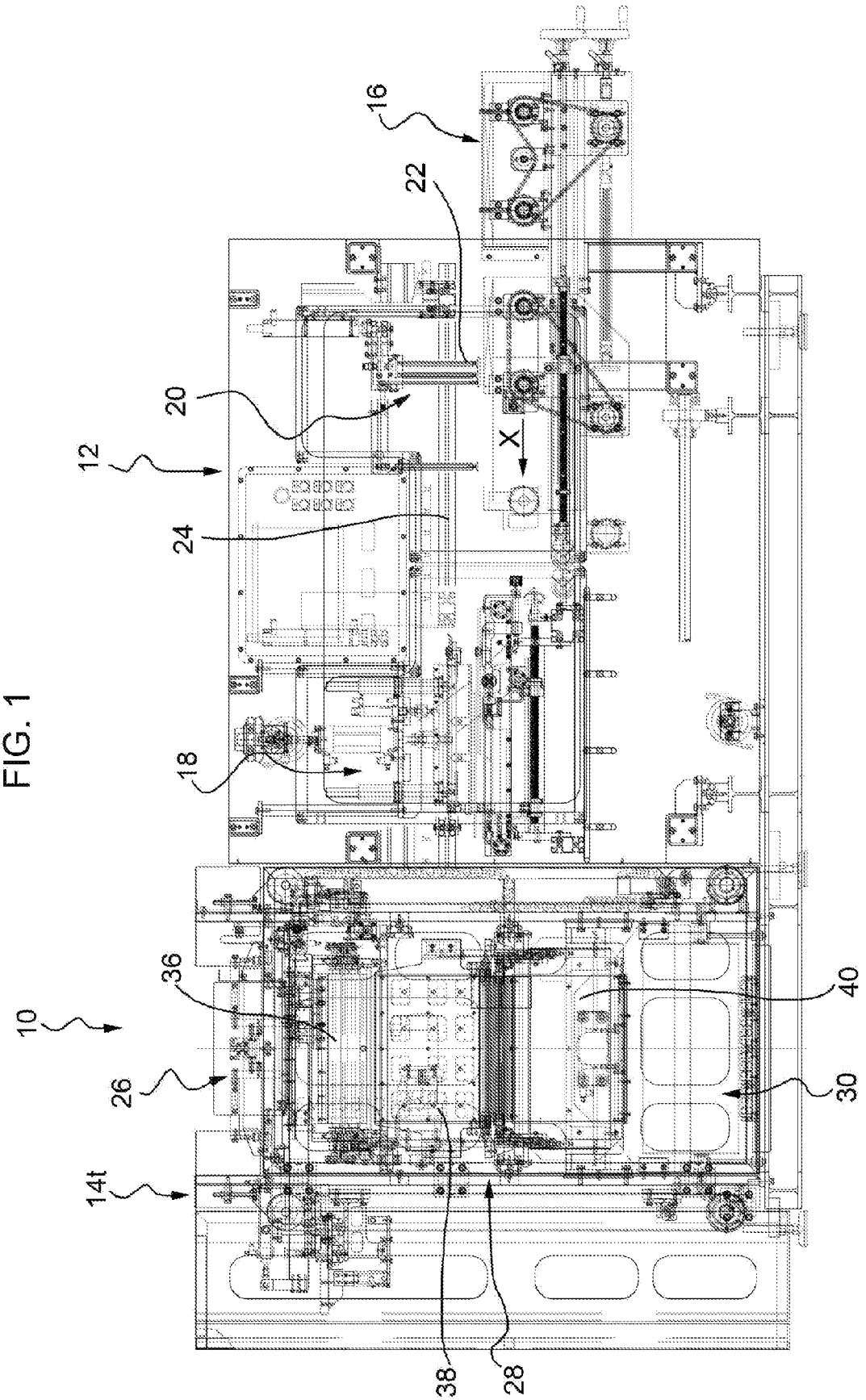


FIG. 2

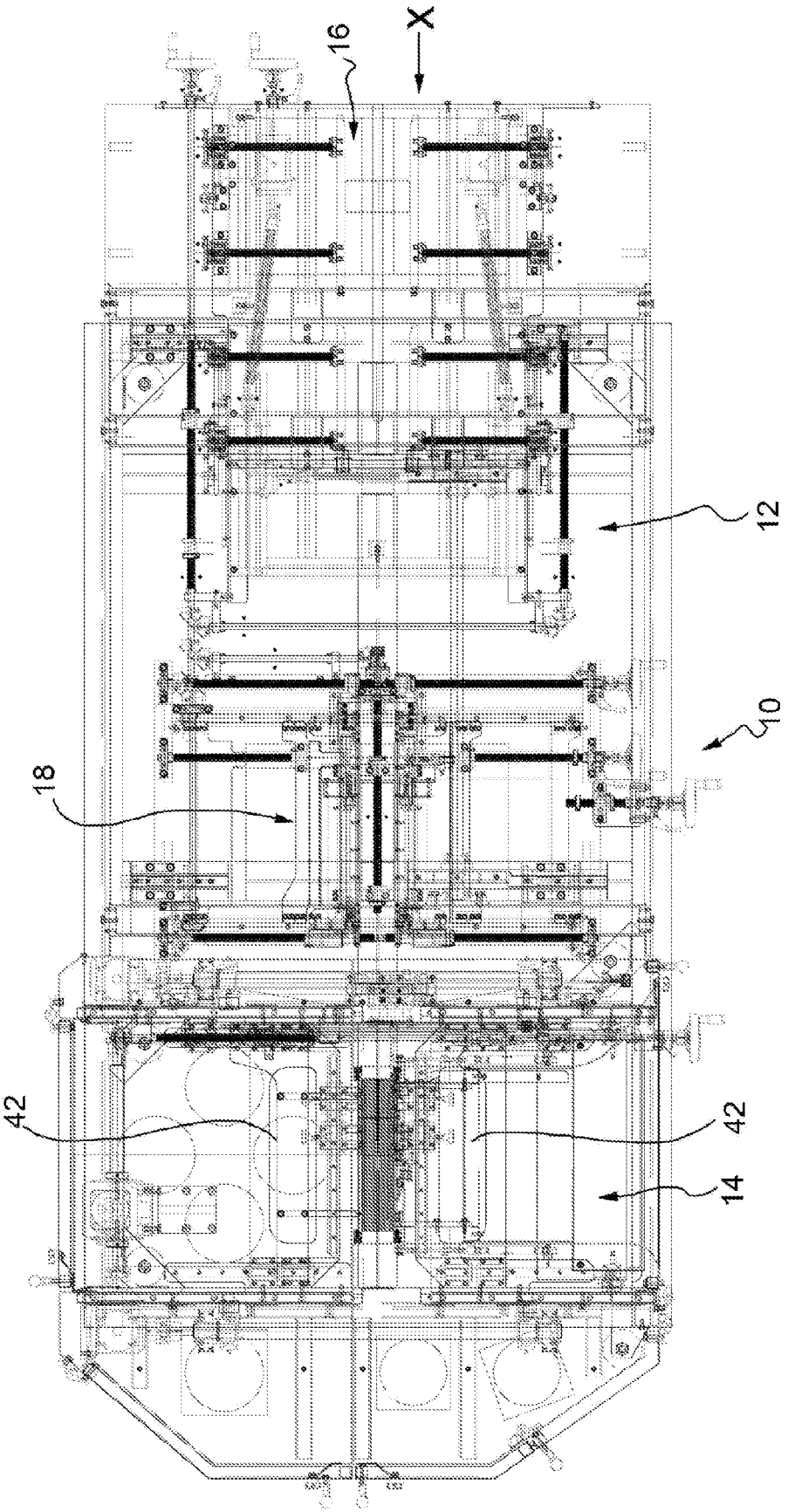


FIG. 3

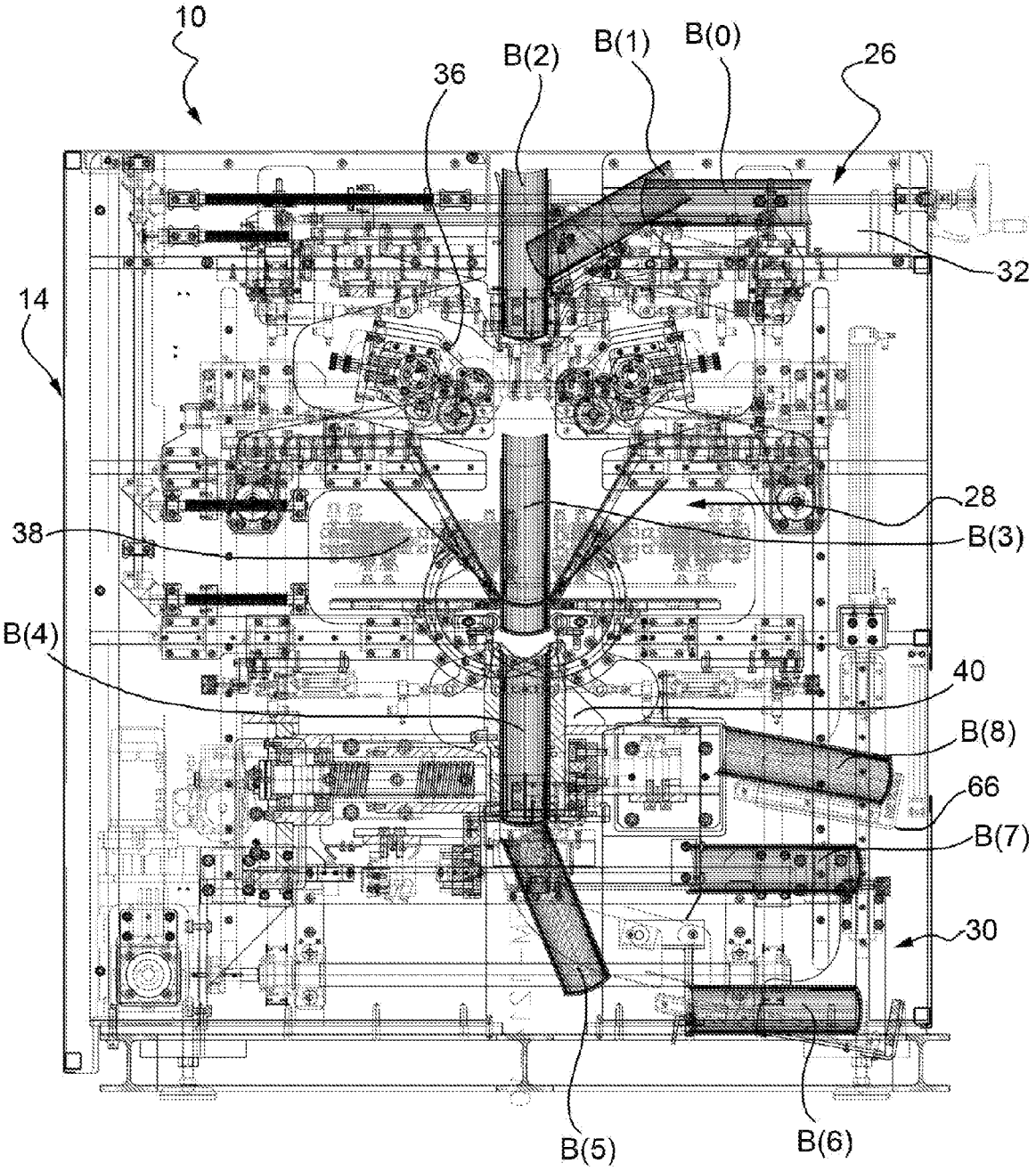


FIG. 4

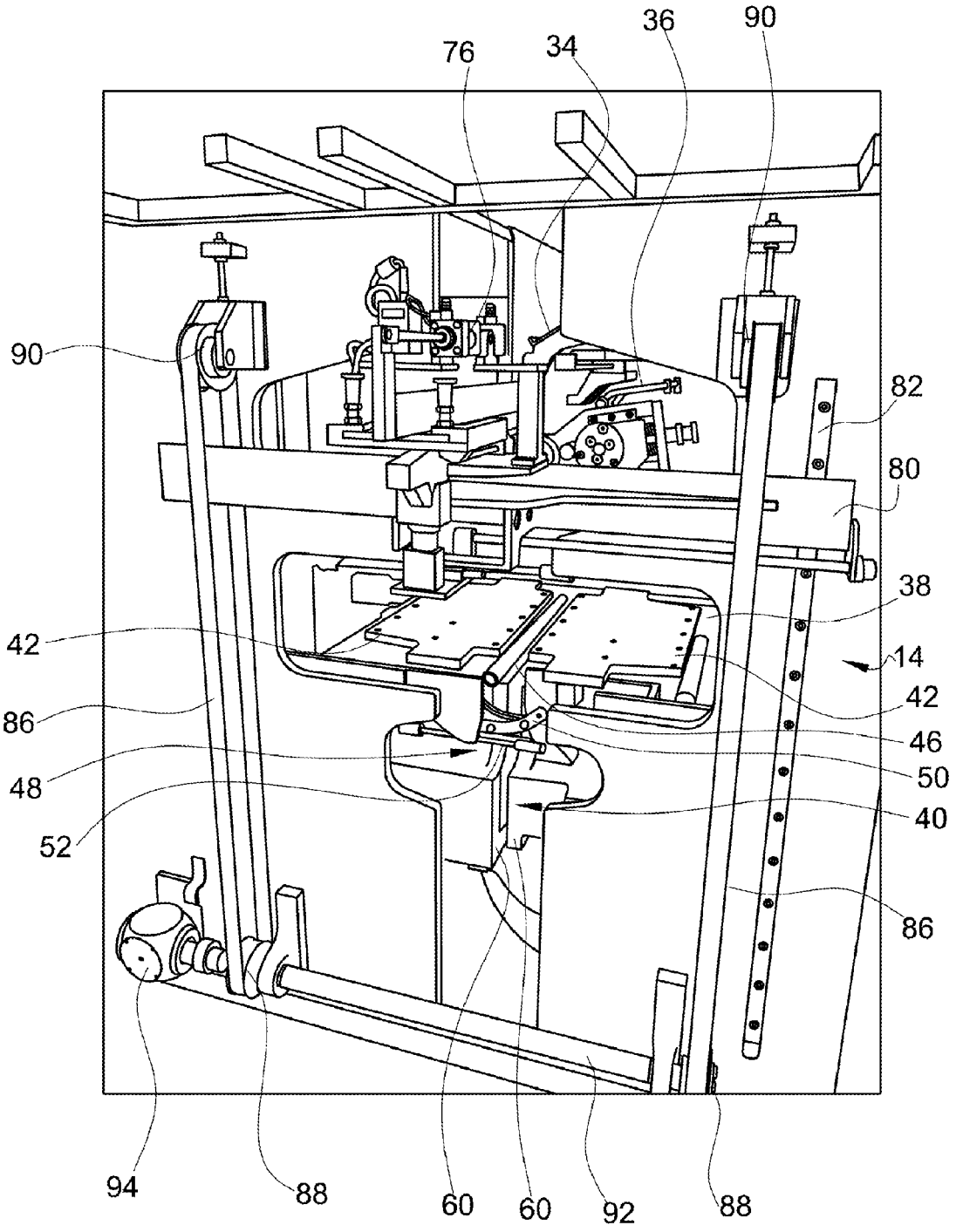


FIG. 5

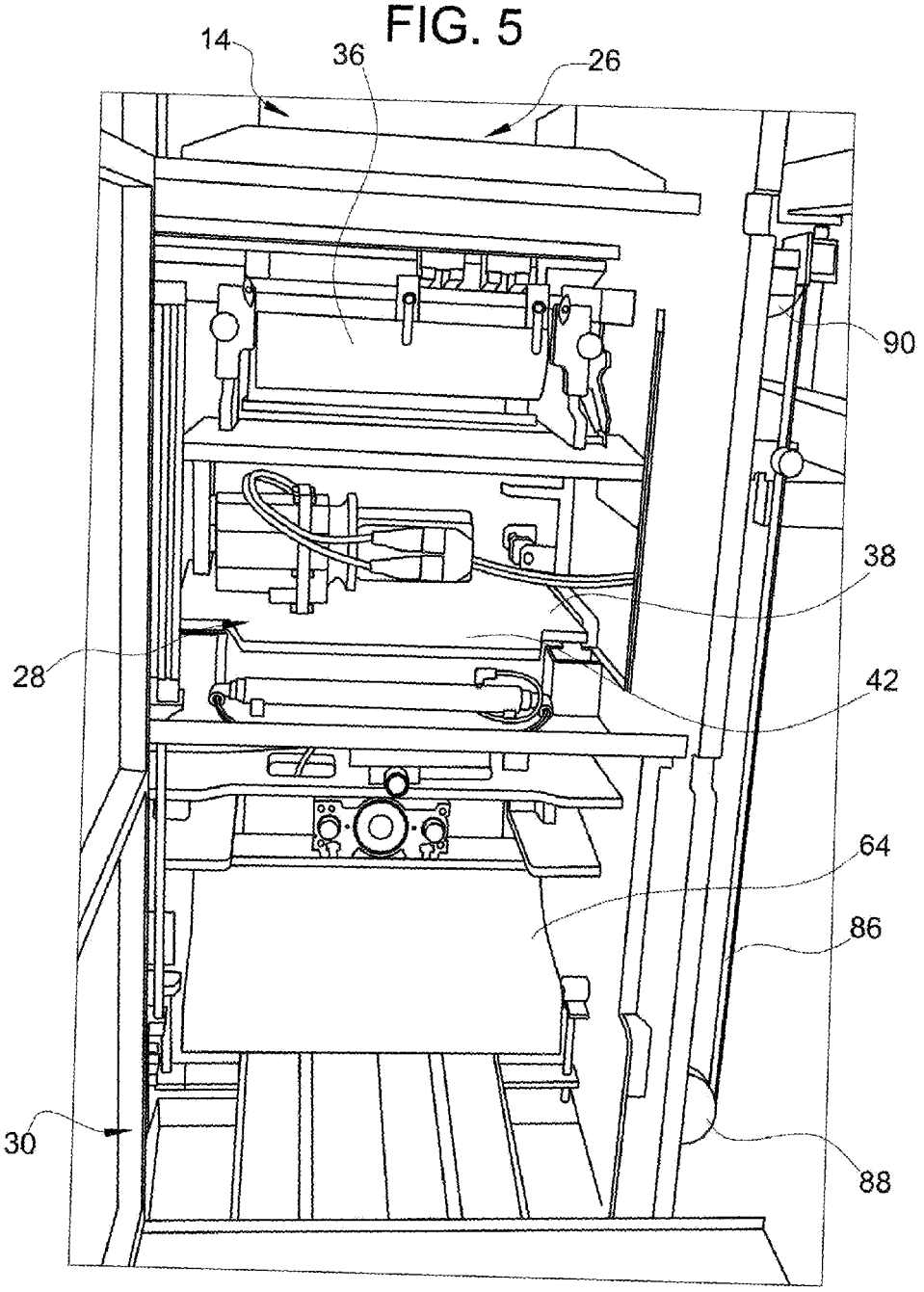


FIG. 6

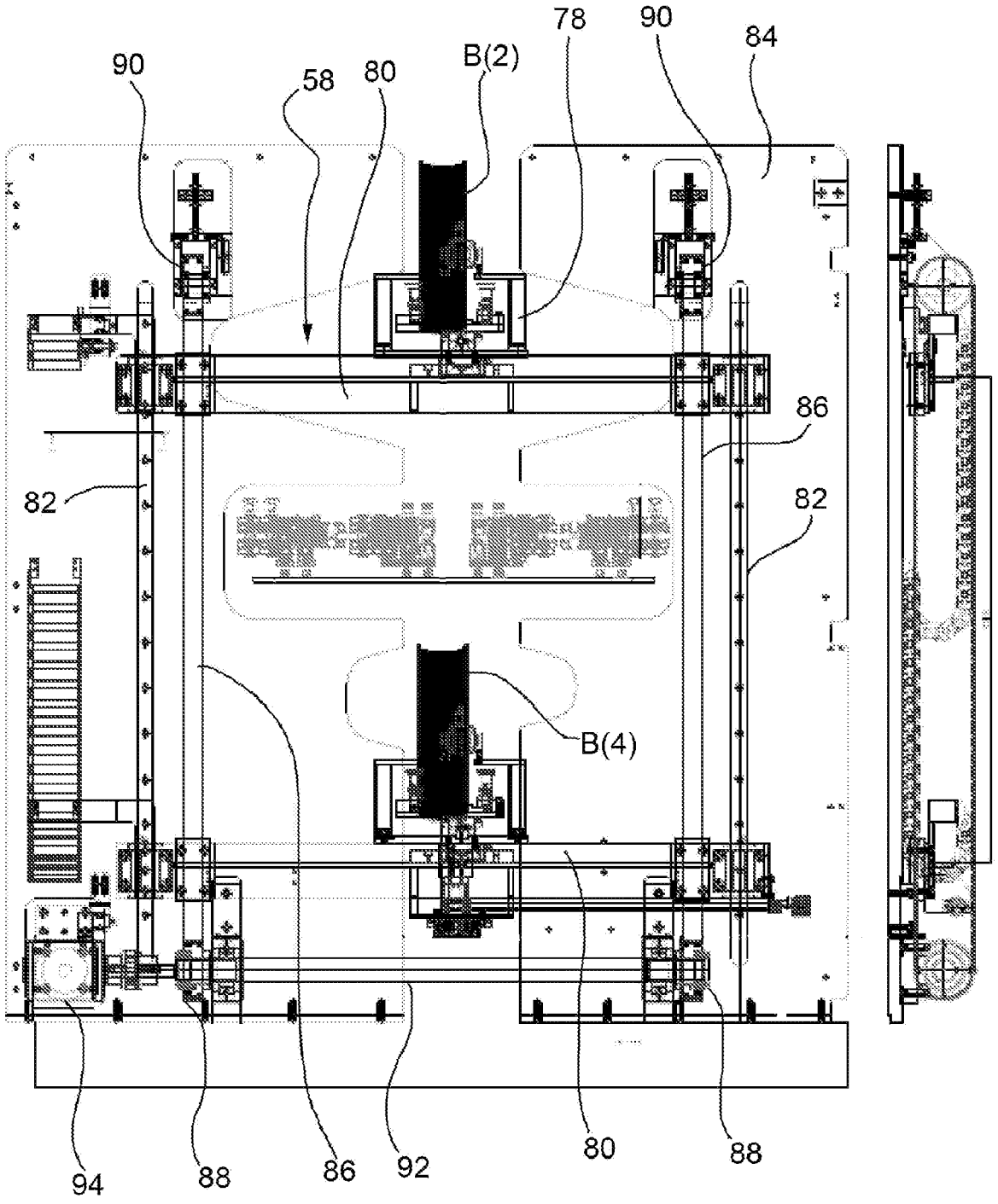
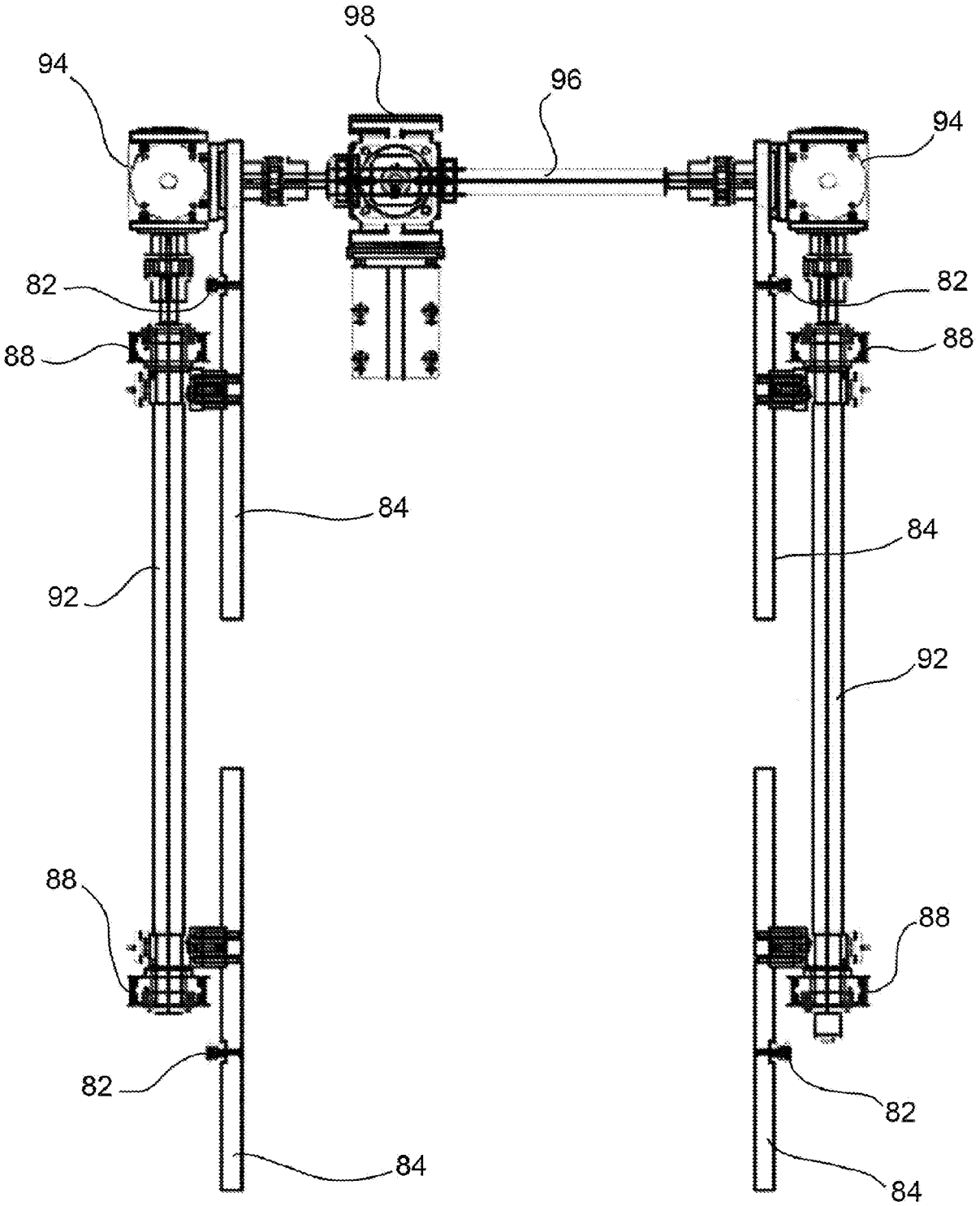


FIG. 7



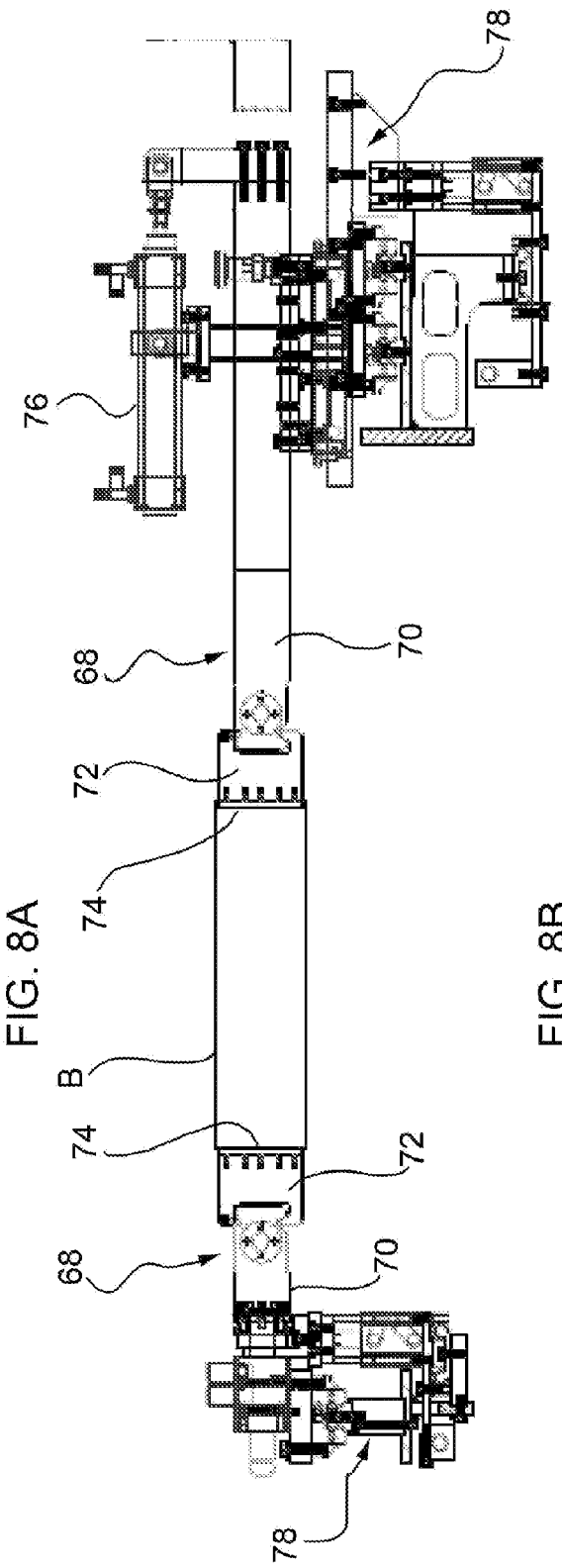


FIG. 8A

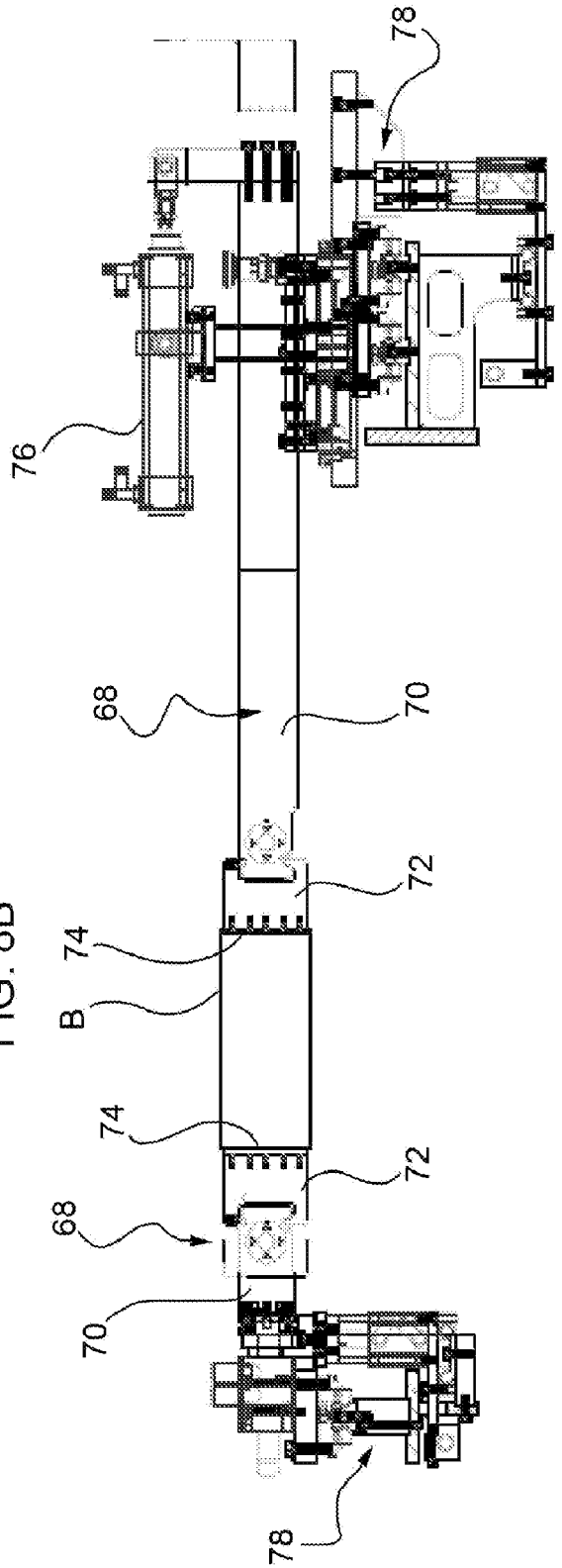


FIG. 8B

FIG. 9

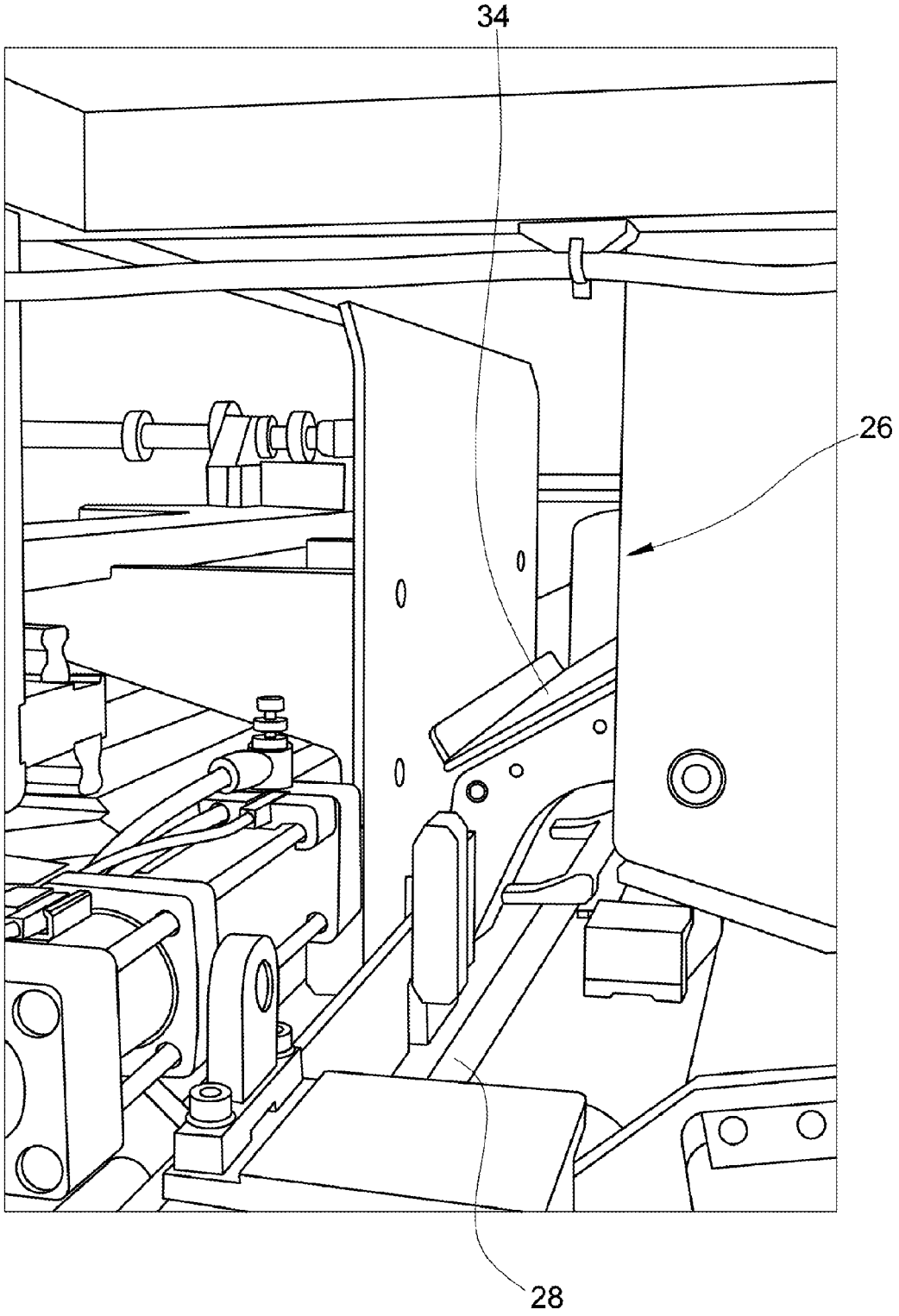


FIG. 10

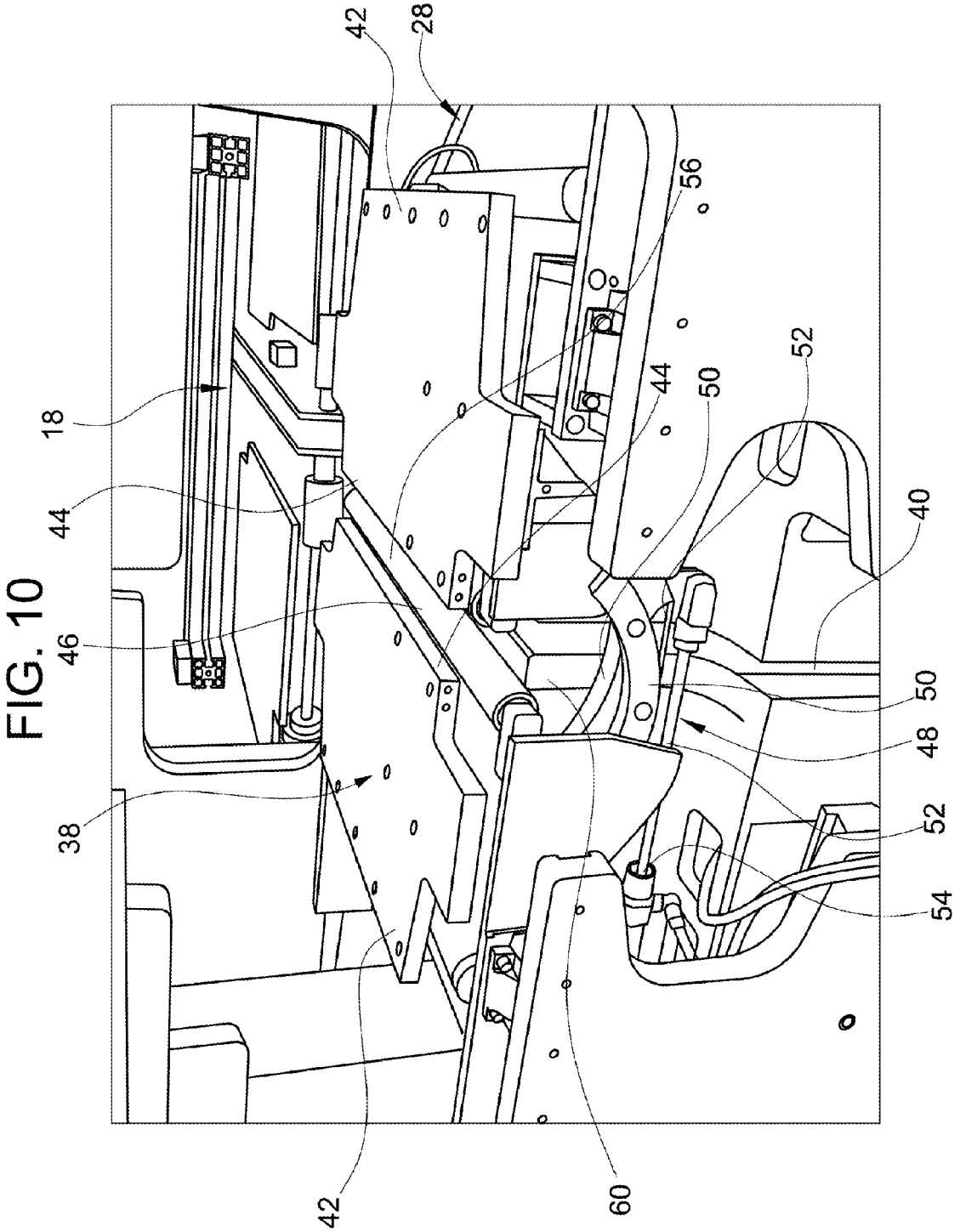
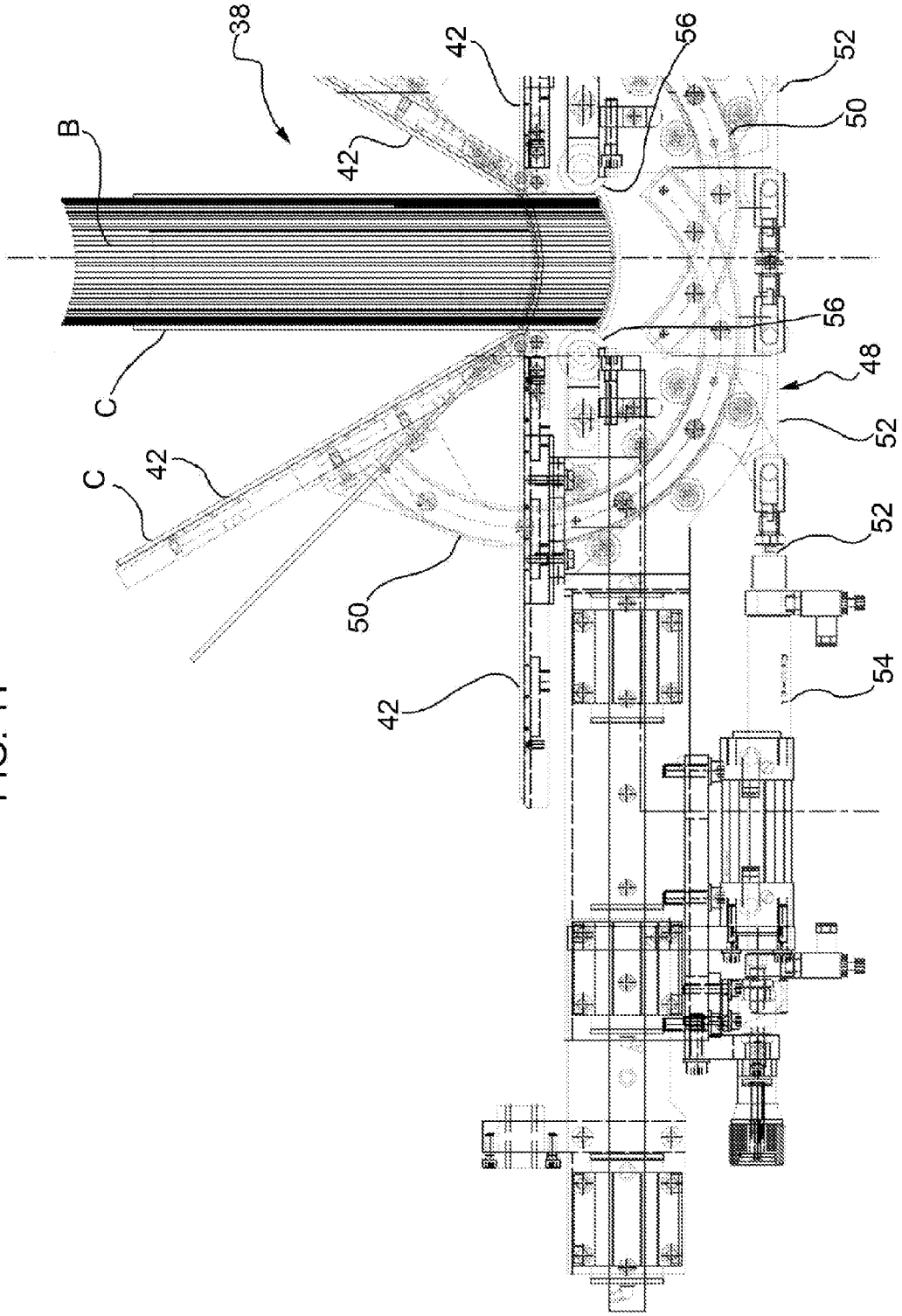


FIG. 11



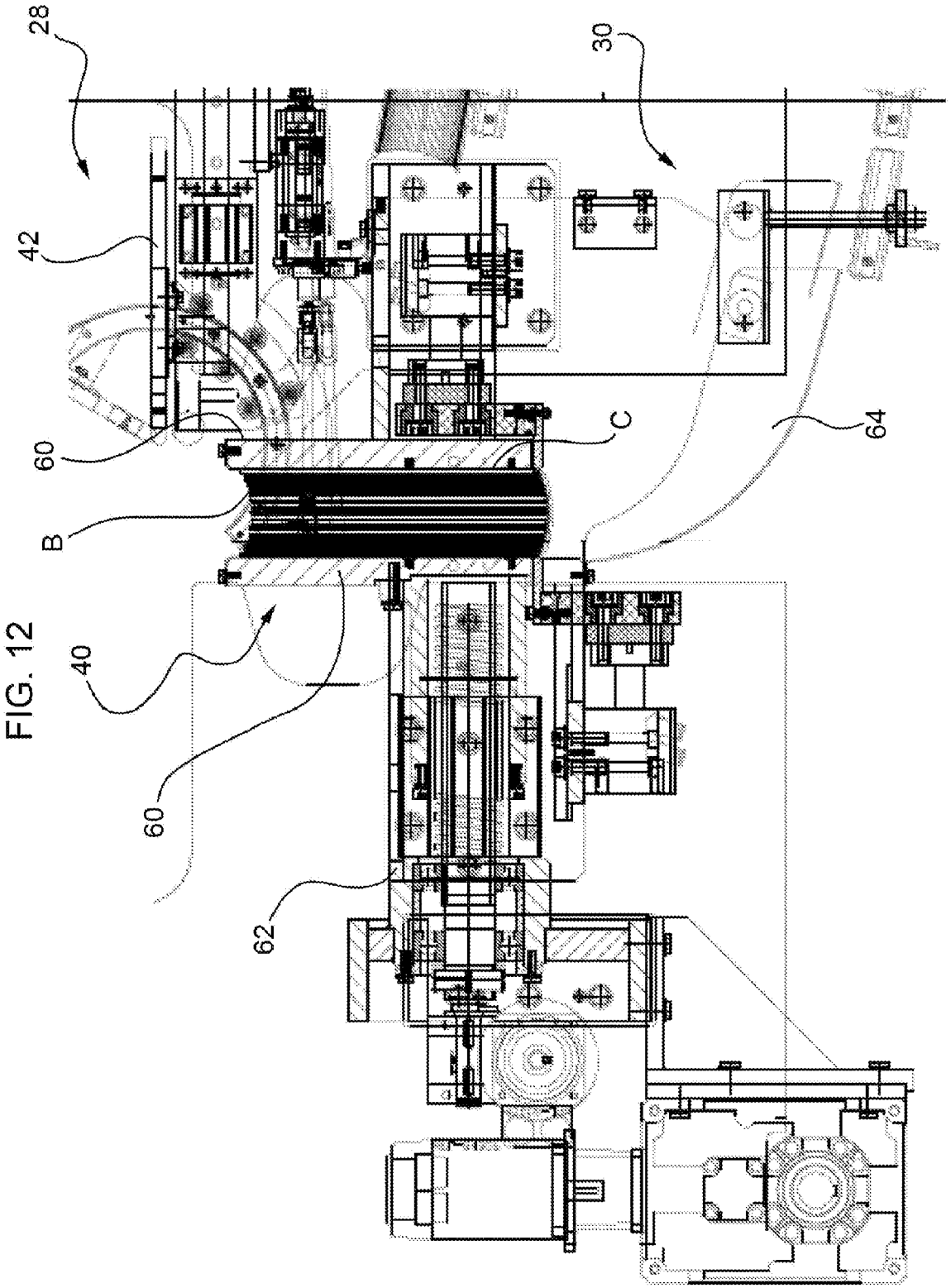


FIG. 12

REFERENCES CITED IN THE DESCRIPTION

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- US 20080056735 A **[0004] [0027]**